

## REMARKS

In the Office Action dated March 4, 2005, the Examiner objected to the Drawings and the Abstract. Applicant has filed concurrently with this Amendment formal Drawings to be reviewed by the Draftsperson. These drawings include a replacement sheet for Figure 1, which shows every element properly remarked as requested by the Examiner. The drawings have also been reordered so that Figures 1-8 flow consecutively through drawing sheets 1-4. In addition, Applicant includes a revised Abstract on a new sheet.

Applicant has also reviewed the Specification and has noted numerous typographical errors. Applicant therefore includes substitute paragraphs to correct the errors in the Specification. No new matter is inserted by way of the amendments to the Specification. Applicant respectfully requests that these amendments be entered.

The Examiner objected to claims 8 and 11. Applicant has amended those claims in light of the Examiner's helpful suggestions. Applicant therefore respectfully requests that the objections be withdrawn.

Applicant has amended claims 6, 12 and 13 to correct errors in the claims. Applicant has also added new claims 14-16 to further define the invention. No new matter is inserted by way of adding new claims.

In the Office Action, claims 1-2 and 4-13 are rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 6,012,161 to Ariyavisitakul et al. In addition, claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ariyavisitakul. Applicant has amended claims 1, 8 and 11 and added claim 14-16 to clarify the claimed invention. Applicant respectfully traverses the Examiner's rejection.

The present invention is directed to a method and apparatus to cancel interference in a multiple access communication channel. The interference to be cancelled by the present invention comes from other users that are accessing the system simultaneously in a CDMA network. The multi-access interference (MAI) is estimated before the cancellation step, and it is disclosed how to weigh those estimates with the use of partial cancellation coefficients. This involves

soft estimates and time-varying coefficients. While the present invention is directed to the signal degradation, it is more accurately directed to the degradation of the signal caused by the multiple users in the communications channel. It is not directed to the degradation of the signal caused by the other factors and the errors that are created in the signal by noise or otherwise. In other words, the present invention is not directed to error correction that are created in the signal from the signal being sent from a transmitter to a receiver. Rather, the present invention is directed to "errors" that are inherent in the decoding of the signal.

In particular, the present invention covers the interference caused to a first data component, which is the desired signal of the channel for the communications link, by a second data component, which are the signals from the other channels within the link. This is achieved by taking an estimation of the received second data component and then subtracting that component from the total received signal. In one preferred embodiment of the invention, the applied functional approximation is a piece-wise linear approximation of the hyperbolic tangent function ( $\tanh$ ). In another preferred embodiment of the invention, the applied functional approximation is a piece-wise linear approximation of a probability of error function.

On the other hand, Ariyavisitakul discloses a method and apparatus of equalization of a received signal. Ariyavisitakul discloses a decision feedback equalization (DFE) where the objective is to improve the decoder performance by "undoing" the degradation introduced by the radio channel in the form of the inter-symbol interference (ISI) and fading as well as Doppler. For this, Ariyavisitakul uses some form of tentative decisions (soft and hard or even partially decoded symbols that are fed back to improve the channel estimation process. Ariyavisitakul teaches that error propagation is overcome. Applicant notes that if the tentative decisions disclosed in the reference are incorrect the disclosed process does nothing to the signal and may actually harm the signal. It is also noted that Ariyavisitakul states that "all channel and noise power estimates are assumed to be perfect." See column 7, line 22-23.

In view of the foregoing, the present invention discloses a method and apparatus to cancel interference is a multiple access channel that uses an estimate of the interference caused by the second data component. On the other hand, the cited reference discloses a method of equalization that is based on feedback of signals, i.e. "the resulting soft decision on current data value  $x_n$  in then passed back through feedback filter 50, for combination with newly arriving data in data signals 20 but delayed by delay  $D$ ." Column 6, lines 19-22. The present invention does not rely on any feedback of signals and does not rely on any delays. In fact, the present invention operates on the received signals and on real time.

In view of the foregoing remarks, Applicants submit that the Ariyavisitakul does not teach or disclose the present invention as found independent claims 1, 8, and 11 and are in condition for allowance. Applicant respectfully requests that the rejection under Section 102(e) be withdrawn. Applicant further submits that dependent claims 2-7, 9-10 and 11-2 in condition for allowance at least by virtue of their dependency on claims 1, 8, and 11.

Applicant has also added new claims 13, 14 and 15 which depend upon independent claims 1, 8, and 11, respectively. New claims 13, 14 and 15 are directed to the aspect of the present invention that estimates of a signal component involves the coded bits, designated by  $d$  in the specification, as well as channel estimates, designated by  $h$  in the specification. Ariyavisitakul does not disclose teach or suggest that estimates of the signal are composed of the coded bits and the channel estimates. Thus, claims 13-15 are patentable over the cited reference. Claims 13-15 are also allowable because of their dependency on allowable claims 1, 8, and 11.

As the applicants have overcome all substantive rejections and objections given by the Examiner and have complied with all requests properly presented by the Examiner, the applicants contend that this Amendment, with the above discussion, overcomes the Examiner's objections to and rejections of the pending claims. Therefore, the applicants respectfully solicit allowance of the application. If the Examiner is of the opinion that any issues regarding the status

of the claims remain after this response, the Examiner is invited to contact the undersigned representative to expedite resolution of the matter.

Please charge any fees associated herewith, including extension of time fees, to **50-2117**.

Respectfully submitted,  
Sequeira, Raul E.

SEND CORRESPONDENCE TO:

Motorola, Inc.  
Law Department

Customer Number: **22917**

By:   
Simon B. Anolick  
Attorney for Applicant  
Registration No.: 37,585  
Telephone: 847-576-4234  
Fax: 847-576-3750